

PATENT COOPERATION TREATY
PCT
INTERNATIONAL SEARCH REPORT
(PCT Article 18 and Rules 43 and 44)

CONFIRMATION

Applicant's or agent's file reference 1138P042PCTj	<div style="display: flex; justify-content: space-between;"><div>FOR FURTHER ACTION</div><div>see Form PCT/ISA/220 as well as, where applicable, item 5 below.</div></div>	
International application No. PCT/SG2004/000330	International filing date (<i>day/month/year</i>) 8 October 2004	(Earliest) Priority Date (<i>day/month/year</i>) 8 December 2003
Applicant NANYANG POLYTECHNIC et al		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of **6** sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ Certain claims were found unsearchable (See Box No. II).

3. ☒ **Unity of invention is lacking** (See Box No. III).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

- a. the figure of the drawings to be published with the abstract is **Figure No. 3**

☒ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

- b. ☐ none of the figures is to be published with the abstract.

Best Available Copy

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SG2004/000330

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

(See supplemental box.)

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SG2004/000330

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. ⁷: G06T 7/60, G06F 19/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 DWPI, PCT, USPTO, internet (microarray, dna chip, gene chip, IPC: G06T, image analysis, dilation, alignment, gridding, inspection, scanner, automated, etc.)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	P. Bajscy, <i>Gridline: Automatic Grid Alignment in DNA Microarray Scans</i> IEEE Transactions on Image Processing, 13(1), pp. 15-25, January 2004 http://altdocs.ncsa.uiuc.edu/PB-20040101-1.pdf	1-21
A	EP 1 450 304 A1 (CITY UNIVERSITY OF HONG KONG), 25 August 2004 the whole document	1-21
A	T. Srinark et al, <i>A Microarray Image Analysis System Based on Multiple-Snake</i> Journal of Biological Systems, 12(4), December 2004 http://vims.cis.udel.edu/publications/srinark-bioj04.pdf (section 2 in particular)	1-21
A	C. Uehara et al, <i>Towards Automatic Analysis of DNA Microarrays</i> Proc. Sixth IEEE Workshop on Applications of Computer Vision, 2002 (section 2.2 in particular)	1-21

☒ Further documents are listed in the continuation of Box C☒ See patent family annex

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search
7 December 2004

Date of mailing of the international search report

2 FEB 2005

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/SG2004/000330

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2002/004123 A1 (ROBODESIGN INTERNATIONAL, INC.), 17 January 2002 the whole document	22-26, 28
X	<i>arrayWoRx[®] Auto Automated Biochip Reader</i> product brochure, as archived 29 May 2003 http://web.archive.org/web/20030529103926/www.appliedprecision.com/pdfs/products/bio/awe_auto_broch.pdf	22-26, 28
X	<i>ScanArray Express Miroarray Scanner</i> product brochure, as archived 19 July 2003 http://web.archive.org/web/20030719141010/http://las.perkinelmer.com/content/RelatedMaterials/P10361_ScanArray_Brochure.pdf	22-26, 28
X, P	WO 2004/017376 A2 (MIRAGENE, INC.), 26 February 2004 the whole document	22-26, 28

Supplemental Box

(To be used when the space in any of Boxes I to VIII is not sufficient)

Continuation of Box No: III

The international application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept. In coming to this conclusion the International Searching Authority has found that there are two inventions:

1. Claims 1-21, directed to a method for automatic inspection of a microarray slide. The use of a dilated image to calculate the orientation of the slide is considered to be a first "special technical feature."
2. Claims 22-28, directed to a system for automatic inspection of a microarray slide. Prima facie, this invention does not appear to have any "special technical features," since it includes only well-known integers and well-known combinations of computing apparatus.

Since the abovementioned groups of claims do not share any technical features, a "technical relationship" between the inventions, as defined in PCT rule 13.2 does not exist. Accordingly, the international application does not relate to one invention or to a single inventive concept.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/SG2004/000330

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report			Patent Family Member		
EP	1450304	NONE			
WO	0204123	AU 71822/01	EP 1307291	US 6558623	
		US 2004062686	WO 2004099937		
WO	2004017376				
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.					
END OF ANNEX					

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- ☐ OTHER: _____

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